REMARKS

Applicants are amending their claims in order to further clarify the definition of various aspects of the present invention. Specifically, claim 17, and claims 16 and 19, have been amended to recite that the water retained in the water-retaining layer is applied to the flow channels through the water permeable layer from, inter alia, "only" a part of a surface of the water permeable layer opposed to the surface of the water permeable layer from which water is applied to the gas flow channels. Furthermore, claims 18, 22 and 24 have been amended to recite that the water-retaining layer is communicated with a channel containing water by means only of a porous humidifying water inlet means. Claim 33 has been amended to recite that the porous water-retaining layer is in communication with a channel containing water by way of a filter, the water-retaining layer communicating with the channel containing water only by way of the filter, which is disposed at a position where the cooling water inlet and the water-retaining layer communicate with each other. Applicants have cancelled claims 9, 34 and 37 without prejudice or disclaimer.

In addition, Applicants are adding new claims 45 and 46 to the application. Claims 45 and 46, each dependent on claim 18, respectively recites that the porous humidifying water inlet means is a humidifying water inlet, and is a porous carbonaceous filter.

In connection with claim amendments, note for example, Figs. 2 and 5, as well as descriptions in connection therewith on pages 9-12, 25 and 26 of Applicants' specification.

The objection to claim 4 as being of improper dependent form for failing to further limit the subject matter of a previous claim, set forth in Item 3 bridging pages 2

and 3 of the Office Action mailed April 4, 2008, is respectfully traversed. Thus, claim 4 recites a water permeable membrane having a function to transmit water, reciting that this water permeable membrane is formed on porous material of the water-retaining layer. While claim 18 recites a water-retaining layer of the humidifier being disposed "to adjoin" a water permeable layer that faces gas flow channels of the stack to humidify at least one of the fuel gas and oxidizing gas and the membrane electrolyte, it is emphasized that claim 18 recites such water-retaining layer is disposed to adjoin such water permeable layer, without positive recitation of the water permeable layer. It is respectfully submitted that claim 4 positively recites the water permeable layer. Thus, it is respectfully submitted that claim 4 further defines the structure of claim 18, in positively reciting the water permeable layer, and thus is of proper dependent form. Reconsideration and withdrawal of the objection to claim 4 are respectfully requested.

It is respectfully submitted that the objection to claim 41 as set forth in Item 4 on page 3 of the Office Action mailed April 4, 2008, is moot, in light of cancelling of claim 9 without prejudice or disclaimer.

Applicants respectfully traverse the rejection of claim 8 as set forth in Item 6 on page 3 of the Office Action mailed April 4, 2008. Claim 8 recites that the water-retaining layer of the humidifier has a carbonaceous porous filter; it is respectfully submitted that, for example, Fig. 5 discloses a porous carbonaceous filter, describing the subject matter of claim 8. See also original claim 8. The contention by the Examiner that amended claim 18 is supported by the embodiment of Fig. 2, with the recitation of claim 8 not supported by the specification "because the embodiment of figure 2 does not include a carbonaceous porous filter", is noted. It is respectfully submitted, however, that Applicants' disclosure as a whole describes such

carbonaceous porous filter, satisfying the description requirement of the first paragraph of 35 U.S.C. §112 in connection therewith.

The rejection of claim 33 under the first paragraph of 35 U.S.C. §112, as failing to comply with the written description requirement, set forth in Item 7 bridging pages 3 and 4 of the Office Action mailed April 4, 2008, is respectfully traversed insofar as applicable to claim 33 as presently amended. Thus, it is respectfully submitted that Fig. 5 and the description in connection therewith, e.g., on pages 25 and 26 of Applicants' specification, disclose structure wherein the porous water-retaining layer is "in communication with" a channel containing water by way of a filter, with the water-retaining layer communicating with the channel containing water only by way of the filter, which is disposed in a position where the cooling water inlet and the water-retaining layer communicate with each other.

The rejection of claim 34 under the first paragraph of 35 U.S.C. §112, as failing to comply with the written description requirement, is moot, in light of present cancelling of claim 34.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the documents applied by the Examiner in rejecting claims in the Office Action mailed April 4, 2008, that is, the teachings of the U.S. patent documents to Kanazawa, Patent Application Publication No. 2003/0087982, and to Yi, et al., Patent Application Publication No. 2001/0004501, Japanese Patent Document No. 08-138704 (Kawazu '704), No. 08-138705 (Kawazu '705) and No. 07-135012 (Mizuno), under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that these documents as applied by the Examiner would have neither disclosed nor would have suggested such a fuel cell assembly as in the present claims, including a plurality of unit fuel cells, with the fuel cell assembly further including a humidifier adjoining an end of the plurality of fuel cells, the humidifier having a hydrophilic water-retaining layer which has a mean micro-pore diameter of 10-300 μm and a thickness of 50-300 μm, and is provided to be in contact with a water permeable layer that faces flow channels of the fuel and oxidizing gasses and has one surface to supply water to the flow channels, with water being retained by capillary force by the water-retaining layer when the fuel cells are not working and is taken by gas fed to the anode and cathode against the capillary force when the fuel cells are working, water being supplied from only a part of a surface opposite to the water supplying surface and/or from the outer edge of the water-retaining layer. See claim 17.

In addition, it is respectfully submitted that the teachings of the applied documents would have neither disclosed nor would have suggested such fuel cell assembly as in the present claims, having a stack of unit fuel cells, and a humidifier connected to one end of the stack, with a water-retaining layer of a humidifier being disposed to adjoin a water permeable layer that faces gas flow channels of the stack, the water-retaining layer being made of a hydrophilic porous member having a mean micro-pore diameter of 10 to 300 μm and a thickness of 50 to 300 μm, with water being retained by capillary force by the water-retaining layer when the fuel cells are not working and is taken by gas fed to the anode and gas fed to the cathode by means of the water permeable layer against the capillary force when the stack of unit fuel cells is working, the water-retaining layer being communicated with a channel

containing water by means only of a porous humidifying water inlet means. See claim 18.

Moreover, it is respectfully submitted that these applied references would have neither disclosed nor would have suggested such a fuel cell assembly as in the present claims, having features as discussed previously in connection with claim 18, and, moreover, wherein the porous humidifying water inlet means is a humidifying water inlet (see claim 45) or a porous carbonaceous filter (see claim 46).

Furthermore, it is respectfully submitted that the teachings of the applied documents would have neither disclosed nor would have suggested a fuel cell assembly including a plurality of unit fuel cells as in the present claims, and also including a humidifier adjoining an end of the plurality of fuel cells, the humidifier being equipped with a water-retaining layer in contact with a permeable layer that adjoins gas flow channels, the water-retaining layer having micro-pores and a thickness as discussed previously, whereby water is retained by capillary force by the water-retaining layer when the unit cells are not working and is taken by the oxidizing gas against the capillary force by means of the water permeable layer when the fuel cells are working, the water-retaining layer being communicated with a channel containing water by means only of a porous humidifying water inlet means. See claim 22.

In addition, it is respectfully submitted that the teachings of the applied documents would have neither disclosed nor would have suggested such a fuel cell assembly including a plurality of fuel cell units and a humidifier, with the humidifier including a porous water-retaining layer having a mean micro-pore diameter as discussed previously, the humidifier adjoining an end of the fuel cell units such that

the water-retaining layer faces a water permeable layer that faces the flow channels thereby to transfer water by means of the water permeable layer introduced into the water-retaining layer to the fuel and/or oxidizing gas flowing in the flow channels, the water-retaining layer being communicated with a channel containing water by means only of a porous humidifying water inlet means. See claim 24.

As discussed in more detail infra, it is respectfully submitted that the teachings of the applied documents do not disclose, nor would have suggested, such structure as in the present claims, including the humidifier having a water-retaining layer disposed to adjoin a water permeable layer as in claims 17, 18, 22 and 24, or having both the water-retaining layer and water permeable layer, with the water-retaining layer having micro-pores and/or thickness as in the present claims, and with the water-retaining layer and water permeable layer being positioned relative to gas flow channels of the fuel cells as in the present claims; and wherein the water-retaining layer has only limited communication, with a water-containing channel, to supply water thereto.

In addition, it is respectfully submitted that the teachings of the applied documents would have neither disclosed nor would have suggested such a fuel cell assembly as in the present claims, having a humidifier and a plurality of fuel cell units, and wherein the humidifier comprises a porous water-retaining layer for retaining water supplied thereinto, the porous water-retaining layer being in communication with a channel containing water by way of a filter, and with the water-retaining layer communicating with the channel containing layer only by way of the filter, which is disposed at a position where the cooling water inlet and the water-retaining layer communicate with each other, the humidifier adjoining an end of the fuel cells such

that the water-retaining layer faces the flow channels to transfer water introduced into the water-retaining layer to the gasses flowing in the flow channels. See claim 33.

Moreover, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such fuel cell assembly as in the present claims, having features as in independent claims 17, 18, 22, 24 and 33, as discussed previously, and additionally having features as set forth in the present dependent claims, such as (but not limited to) wherein the water-retaining layer is made of a hydrophilic polymer material, a carbonaceous porous material, or a composite material thereof (see claim 2); and/or wherein the thickness of a humidifying water inlet of the humidifier is ½ to ¾ of the thickness of the porous member (see claim 3); and/or wherein a water permeable membrane having a function to transmit water is formed on porous material of the water-retaining layer (see claim 4), more particularly, the size and porosity of the water permeable membrane respectively as in claims 5 and 6, and material of the water permeable membrane as in claim 7; and/or wherein the water-retaining layer of the humidifier has a carbonaceous porous filter, as in claim 8; and/or wherein the porous member has a hydrogen-oxidizing catalyst dispersed therein (note claims 41-44); and/or a power generation system including, inter alia, the fuel cell assembly of claim 18, as in claim 11; and/or wherein the water-retaining layer has a hydrophilic porous member as in claim 13; and/or wherein the water-retaining layer has a porous member provided adjoining the end of the plurality of fuel cell units and has a water supplying surface to supply water to the flow channels, with water being supplied to the water-retaining layer from only a part of a surface opposite to the water supplying surface of the porous member and/or from the outer edge of the porous member (see claim 16);

and/or wherein water retained in the water-retaining layer is supplied to the flow channels from one of (a) only a part of a surface of the water permeable layer opposed to the surface thereof from which water is supplied to the flow channels, and (b) the outer periphery of the porous member (see claim 19); and/or wherein the fuel cell assembly has at least two water-retaining layers (see claim 20); and/or wherein the carbonaceous porous filter controls flow rate of water to the water-retaining layer (see claim 21); and/or wherein the water-retaining layer is a material as set forth in claim 23 (see also claims 30 and 38); and/or wherein the humidifier further includes a water permeable membrane, positioned as set forth in claim 25; and/or further definition of position of the water-retaining layer or water permeable layer as in claim 28 (see also claims 29, 31 and 39); and/or wherein the assembly has a single humidifier (see claims 32 and 40).

The invention as claimed in the above-identified application is directed to a fuel cell assembly including a plurality of unit fuel cells, and a power generation system using such fuel cell assembly. In particular, the present invention is directed to such fuel cell assembly, and such power generation system, including polymer electrolyte fuel cells.

As described on page 1 of Applicants' specification, a unit fuel cell of the polymer electrolyte fuel cell (PEFC) includes a membrane-electrode assembly having a proton exchange membrane, which is a proton-conductive membrane sandwiched between porous electrodes, and a unit cell separator having gas flow channels which supply hydrogen gas to the anode and air (oxygen) to the cathode, respectively. The proton-conductive membrane must be kept wet to a certain level, to let protons move; and various mechanisms have been proposed as apparatus to humidify fuel gasses,

as described on pages 2 and 3 of Applicants' specification. Various previously proposed humidifiers have problems such as consuming power, which reduces efficiency of the fuel cell system, and disadvantageously increasing size of the assembly.

Against this background, Applicants provide a fuel cell assembly including a humidifier, which avoids problems of previously proposed humidifiers, avoiding a reduction in efficiency of the fuel cells and avoiding an increase in the size of the assembly. The fuel cell units of the present invention are simply constructed of minimum elements, so that total volume is minimized and is fabricated at reduced cost. Furthermore, the present invention, having a minimal number (e.g., one or two) of humidifiers, is very flexible in design thereof.

According to the structure of the present invention, having, inter alia, limited communication of the water-retaining layer with the channel containing water (that is, communication by means only of a porous humidifying water inlet means, as in claims 18, 22 and 24; or wherein water is supplied from only a part of surface opposite to the water supplying surface and/or from the outer edge of the water-retaining layer; in other words, the water-retaining layer is not opposed to a cooling water passage), the water supply port does not face a gas passage by way of the water-retaining layer. Note, for example, pages 10 and 11 of Applicants' specification. The presently claimed structure prevents movement of the water-retaining layer into the gas flow passages. For example, when pressure of the cooling water increases, the water-retaining layer according to the present invention does not move into the gas flow passage; that is, the water-retaining layer is not affected by the pressure of water, because all pressure differential is applied to the humidifying water inlet 202 (see Fig.

2, for example), which is disposed between the water-retaining layer and the cooling water inlet 202. That is, there is no pressure difference between the water-retaining layer and the flow passage. As a result, the flow channels of gas to be humidified are not clogged, and a humidifying amount can be kept constant.

Furthermore, with the structure according to the present invention, damage of the humidifying apparatus, caused by discharging free water not held by the micro-pores, can be avoided.

In addition, since flow channels of the gas to be humidified face the water-retaining layer or water permeable layer, and with the porous humidifying water inlet means being the only means by which the water-retaining layer communicates with the channel containing water, the water-retaining layer is not pressed toward the gas flow channels or the cooling water flow channels by a pressure differential. This is because the cooling water flow channels are not formed on the entirety of the rear surface of the gas flow channels. The present invention brings about such advantages as stability of the humidifying amount, even where there is a change in the gas pressure.

According to the structure of the present invention, clogging of flow channels does not take place, and breakage of the elements, or contamination, can be avoided. Since the water-retaining layer does not retain water excessively after the water-retaining layer retains a desired amount of water, freezing of the humidifier is prevented, because the water-retaining layer does not store water other than that of the micro-pores.

Furthermore, according to that aspect of the present invention utilizing a filter, the filter does not contact directly with gas, and the supply amount of water from the

water-retaining layer to the gas is not directly controlled, but a supply amount of water to the water-retaining layer can be controlled by the filter. This avoids free water that is not held by the micro-pores. Since the filter does not face directly to the gas flow channels, and since the filter does not receive any influence of gas pressure, it is possible to supply a staple humidifying amount even when gas pressure changes. Furthermore, damage of the humidifier by freezing can be avoided. Moreover, since the filter according to the present invention can be sandwiched between an outer member (see the structure represented by reference character 206 in Fig. 5) and a member 210, as shown with reference character in Fig. 2, the filter is not positioned between gas flow channels, eliminating free water not retained by the micro-pores. Furthermore, since the filter can be held by a holder and a member holding the water-retaining layer, a filter will not be broken even when a pressure different increases. In particular, at the time of freezing of water, supply of water from the filter stops, thereby preventing breakage of the water-retaining layer or water permeable layer by freezing.

The objectives of the present invention are further achieved by utilizing the humidifier having a water-retaining layer, with, e.g., a mean micro-pore diameter and thickness as in various of the present claims, particularly wherein this water-retaining layer is made of a hydrophilic porous member, and wherein this water-retaining layer is used together with a water permeable layer that faces flow channels of the fuel cells, and whereby water is retained by capillary force by the water-retaining layer when the plurality of unit fuel cells is not working and is taken by the oxidizing/fuel gasses against the capillary force when the plurality of unit fuel cells is working. Using apparatus (a humidifier) as in the present invention, excess humidification of the fuel/oxidizing gasses can be avoided, and a simple and effective humidification of the

fuel/oxidizing gasses can be provided, with other advantages as discussed previously in this paragraph. Note, for example, the paragraph bridging pages 9 and 10, as well as the sole full paragraph on page 10, of Applicants' specification.

Through use of the present structure, having the water-retaining layer as in the present claims and the water permeable layer that faces the flow channels, when the fuel cells are not operating the humidifying water held in the water-retaining layer remains held in micro-pores of the water-retaining layer by capillary force, preventing the, e.g., anode gas from being humidified too much and reducing the humidity of the anode gas. Note, for example, page 10, lines 14-23, of Applicants' specification.

Moreover, the gasses (fuel/oxidizing gasses) can be humidified to desired degrees according to flow rate of the gasses, by a simple and efficient technique forcing the water to the gasses fed to the anode and cathode against the capillary force when the plurality of fuel cells is working.

It is emphasized that according to claims 17, 18, 22 and 24, and claims dependent thereon, the humidifier of the present invention is featured by a combination of a water-retaining layer to be in contact with a water permeable layer that faces gas flow channels. The water-retaining layer retains water therein and does not release water when the cell is not in operation, but when the cell is operating, the water-retaining layer releases water to the water permeable layer because the water permeable layer transfers water to the flow channels.

According to another feature of the present invention as set forth in claim 33 and claims dependent thereon, and shown in Fig. 5 and discussed in connection with Embodiment 3 (note pages 25 and 26 of Applicants' specification), the humidifying water inlet at which the cooling water from the cooling water flow channel touches the

water-retaining layer is replaced by a filter (e.g., a porous carbon filter). The cooling water is supplied to the water-retaining layer through this filter. This can omit the water-permeable membrane, as the filter can control the flow rate of part of the cooling water from the cooling water flow channel to the water-retaining layer. In other words, this Embodiment can control the water content of the water-retaining layer by the filter, and let the water-retaining layer directly humidify the gas even when the water permeable membrane is not provided.

Kawazu '704 discloses a hydrogen gas humidifier constituted with a porous film, and separators which interpose the porous film from both sides and form a hydrogen gas flow path and a water flow path respectively. The porous film 111 is a polyolefin porous film and has a hydrophilic nature. This patent document discloses that water is easily vaporized by receiving heat from both the porous film and the hydrogen gas, humidification being conducted in a state of steam. In Kawazu '704 the porous carbon 610 contacts the gas; the porous carbon 610 is used for preventing breakage of the porous membrane 111 due to pressure differences. It is respectfully submitted that the position and function of the porous carbon in Kawazu '704 are different from those of the filter according to the present invention.

Moreover, positioning of the porous carbon 610 in Kawazu '704 is noted; in view thereof, the cooling water channels or gas flow channels may be clogged by the filter when portions of the filter are deformed or broken, due to conditions such as when there is an increase in pressure differential. Moreover, when freezing of cooling water takes place in the structure of Kawazu '704, the filter may be broken, and the humidifier will not work. Such problems are avoided by the present invention, including the filter as in the present claims, positioned as set forth therein. In

particular, and as set forth previously, if water freezes at the filter, in the structure of the present invention, supply of water from the filter stops, thereby to prevent breakage of the water-retaining layer or water permeable layer by freezing.

Mizuno discloses a fuel gas humidifying layer constituted of a water permeable layer and a gas flow path structure. The water permeable layer comprises a film-shaped microporous film made of polypropylene, and a hydrophilic layer formed by laminating nonwoven fabric in a surface of the microporous film. In the microporous film, water is permeated in accordance with a pressure difference between both sides bordering the film.

Thus, in Mizuno, the structure characterized by the Examiner as the filter is adjacent the water flow path, adjacent the entirety of a main surface thereof, the entire back surface of the structure characterized by the Examiner as the filter being between the water flow path 308 and the fuel gas flow path 348. Compare with the presently claimed invention, wherein the water-retaining layer communicates with the channel containing water only by way of the filter, the filter being positioned where the cooling water inlet and the water-retaining layer communicate with each other. As stated previously, as the filter according to the present invention does not contact directly with gas, and since a supply amount of water to the water-retaining layer can be controlled by the filter, this avoids free water not held by the micro-pores. Moreover, since the filter according to the present invention does not face directly to the gas flow channels, and since the filter is not influenced by gas pressure, it is possible to supply a stable humidifying amount even when gas pressure changes.

It is emphasized that according to Kawazu '704, a porous membrane 602 is sandwiched between porous carbon members 610, such porous carbon members

being provided for good permeability of gas and water, and for mechanical strength. Similar function is performed by the structure of Mizuno, being relied upon by the Examiner as the filter.

In contrast, according to the present invention, the filter (e.g., a porous carbon filter) can be utilized to supply controlled amount of water to the water-retaining layer from the cooling water channels. The porous filter according to the present invention has, to be illustrative and not limiting, an average pore size of 50 μm and a porosity of 0.55.

Clearly, neither of Kawazu '704 or Mizuno would have disclosed or would have suggested the subject matter of, e.g., claim 33, including the filter and location thereof, achieving the function thereof as in the present invention.

It is respectfully submitted that the teachings of references as applied by the Examiner in Items 13 and 14 on pages 7-13 of the Office Action mailed April 4, 2008, would have neither disclosed nor would have suggested that aspect of the present invention as in, inter alia, claims 17, 18, 22, and 24.

Kawazu '704 and Mizuno have been previously discussed.

It is respectfully submitted that the oxygen gas channels 113P and water flow channels 115P of Kawazu '704 face each other by means of a porous film 111, as shown in Fig. 1 thereof. According to this structure, when the pressure of water or gas becomes excessively large, the porous membrane deforms to clog flow channels, which may lower pressure and the humidifying amount may be affected, because materials for the porous film 111 and water permeable membrane 310 are made of soft materials such as polyolefin films. Moreover, it is respectfully submitted that with structure as in Kawazu '704, there is such a problem that damage or breakage of the

porous sheets can take place by mechanical shock, or contamination of gas by corrosion can occur when foamed nickel is used. Moreover, in the structure disclosed in Kawazu '704, since the membrane directly faces the water flow channels, there may be breakage of the membrane due to expansion of frozen water.

As with Kawazu '704, in Mizuno the water flow channels 308 face the hydrogen gas flow channels 348 by means of a water permeable membrane 310. According to the structure, when the pressure of water or gas becomes excessively large, the porous membrane deforms to clog flow channels, which can lower pressure and affect the humidifying amount. Particularly since the water permeable membrane 310 in Mizuno is made of a soft material such as polypropylene film, such deformation can occur, with resulting problems as discussed previously. Again, as discussed previously, clogging of flow channels do not take place according to the structure of the present invention, and breakage of the elements, or contamination, can be avoided, the structure of the present invention having communication of the water-retaining layer and the channel containing water as in the present claims.

Yi, et al. discloses fuel cell power plants utilizing a water transport plate having interdigitated flow channels therein to furnish the reactant gasses to the fuel cell. The disclosed structure includes hydrophilic substrate layers within both the anode and cathode support plates, having a predetermined level of porosity and pore size, the structure using a pressure differential between the coolant stream and the reactant gas streams to control the respective distribution of the streams within the pores of the hydrophilic substrates, the structure providing a means for creating a pressure differential between the reactant gas streams and the coolant stream such that the pressure of the reactant gas streams is greater than the pressure of the coolant

stream. Note, in particular, paragraphs [0009]-[0011] on page 2 of Yi, et al. Note, further, paragraph [0014] on page 3, and paragraphs [0037]-[0039] on pages 3 and 4, of Yi, et al. See also paragraphs [0054]-[0056] on page 6, and paragraph [0065] on page 8, of Yi, et al.

Even assuming, arguendo, that the teachings of the references as applied by the Examiner would have been properly combinable, such combined teachings that neither disclosed or would have suggested the presently claimed structure, including, inter alia, wherein water is supplied from only a part of surface opposite to the water supplying surface and/or from the outer edge of the water-retaining layer (see claims 17 and 19); and/or wherein the water-retaining layer is communicated with a channel containing water by means of only a porous humidifying water inlet means, as in claims 18, 22 and 24.

It is noted that the present invention is featured by a water-retaining layer that retains almost no free water, that is not kept by the micro-pores on the rear surface of the gas flow channels. That is, e.g., only the humidifying water intake port 202 or filter 501 of the water-retaining layer contacts the cooling water channels 204, according to the present invention. It is respectfully submitted that the structure would have neither been taught nor suggested by any of Kawazu '704, Mizuno and Yi, et al, or any combination of the teachings of these references. That is, according to the present invention, water is introduced on the water-retaining layer only through, e.g., the water inlet 202 or filter 501. Accordingly, an amount of water retained in the water-retaining layer is limited to a capacity of the micro-pores.

In contrast, in Kawazu '704, free water is present in the cooling water channels 115P and in the cooling water channels 96, 98 or Yi, et al. It is respectfully submitted

that the presence of the free water may bring about damage to the humidifying device in case of freezing of the free water. The frozen water may break the hydrophilic film and/or gas flow channels. According to the structure of the present invention, since there is almost no free water, the freezing problem will not occur.

Similarly, in each of Mizuno and Yi, et al, there exists free water present in cooling water channels, causing problems as discussed in the foregoing in connection with the combined teachings of Kawazu '704 and of Yi, et al. As discussed previously, these problems are avoided according to the present invention.

It is respectfully submitted that the additional teachings of Kanazawa, or of Kawazu '705, applied in paragraphs 16-18 on pages 13-15 of the Office Action mailed April 4, 2008, would not have rectified the deficiencies of the previously discussed references, such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Kawazu '705 discloses a hydrogen gas humidifier constituted with a porous film, a catalyst reaction layer formed on its one side surface, and separators which interpose the porous film and the catalyst reaction layer from both sides and form a hydrogen gas flow path and a water flow path respectively. This patent document discloses that water in the water flow path permeates the porous film and the catalyst reaction layer according to a difference in pressure of water flowing in the water flow path and the pressure of hydrogen gas flowing in the hydrogen gas flow path, with permeated hydrogen gas reversely flowing from the hydrogen gas flow path side to the catalyst reaction layer through the porous film reacting with oxygen dissolved in water by the action of the platinum catalyst.

Kanazawa discloses a method of modifying properties of a polymeric material, to improve characteristics such as water absorption, hydrophilic properties and adhesion, etc., of a polymeric material without lowering the practical strength of the material, and the product formed by such method. This patent discloses that the polymeric materials treated include, for example, polyolefin.

Even assuming, arguendo, that the teachings of Kawazu '705 or Kanazawa, as applied by the Examiner in paragraphs 16-18 of the Office Action mailed April 4, 2008, were properly combinable with the other references as applied by the Examiner, such teachings would have neither disclosed nor would have suggested the structure as in the present claims, including, inter alia, wherein the water-retaining layer is communicated with a channel containing water by means only of a porous humidifying water inlet means, as in, for example, claims 18, 22 and 24, and the advantages thereof as discussed in the foregoing.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently pending in the above-identified application are respectfully requested.

Applicants request any shortage in fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP,

Deposit Account No. 01-2135 (case 520.43216X00), and credit any excess payment of fees to such Deposit Account.

Respectfully submitted,

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